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Compositions and Methods for Protecting Animals from Lentivirus-Associated Disease Such as Feline Immunodeficiency Virus

This application claims priority from provisional application Serial No. 60/097,645, filed August 24, 1998.

Field of the Invention

The present invention is directed to a novel strain of feline immunodeficiency virus (FIV) and to a variety of mutated forms of this virus. Compositions and methods are disclosed that can be used in the protection of animals from lentiviral associated disease.

Background of the Invention

Feline immunodeficiency virus (FIV) infection in cats results in a disease syndrome that is similar to that caused by human immunodeficiency virus-1 (HIV-1) infection in humans. Disease progression begins with a transient acute phase (8–10 weeks), followed by a prolonged asymptomatic phase (lasting from weeks to years) and a terminal symptomatic phase (Ishida *et al.*, 1990, Jpn. J. Vet. Sci. *52*:645–648). Viral load in plasma has been demonstrated to correlate with disease stage in infected cats and can be used to predict disease progression in accelerated FIV infection (Diehl *et al.*, 1996, J. Virol. *70*:2503–2507).

Structurally, the FIV provirus contains two long terminal repeats (LTRs), one at either end of the genome (Talbott *et al.*, 1989, Proc. Nat'l Acad. Sci. *USA 86*:5743–5747). There are three large open reading frames (Gag (group antigens); Pol (polymerase); and ENV (envelope)) and three small open reading frames encoding regulatory proteins (Rev (regulator of expression of virion, a protein that binds to "RRE" elements present in all viral transcripts and promotes their translocation from the nucleus to the cytoplasm of infected host cells); Vif (virion infectivity factor); and ORF(2) (open reading frame 2)). The Gag precursor polypeptide of FIV is processed into three mature structural proteins: a matrix protein (MA), a capsid protein (CA), and a nucleocapsid protein (NC). The Pol gene encodes four enzymatic proteins: a protease (PR), a reverse transcriptase (RT), a deoxyuridine triphosphatase (DU), and an integrase (IN). Finally, the ENV precursor polypeptide is processed into two envelope proteins: a surface protein (SU) and a transmembrane (TM) protein.

There have been several attempts to develop a safe and effective vaccine to FIV. Matteucci found that cats inoculated with a conventional fixed cell vaccine were protected from challenge with homologous virus despite an apparent absence of neutralizing antibodies after vaccination. Protection was found to be short-lived and difficult to boost (Matteucci *et al.*, 1996, J. Virol. *70*:617-622; Matteucci *et al.*, 1997, J. Virol. *71*:8368-8376). These results may be contrasted with those of Verschoor, who observed no protection after the administration of a fixed cell vaccine (Verschoor *et al.*, 1995, Vet. Immunol. Immunopathol. *46*:139-149).